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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,746	01/27/2004	Tie Wang	27-013	2840

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THE LAW OFFICES OF MIKIO ISHIMARU  
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EXAMINER

DOLAN, JENNIFER M

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 05/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

A

<b>Advisory Action</b> <b>Before the Filing of an Appeal Brief</b>	Application No. 10/766,746	Applicant(s) WANG ET AL.	
	Examiner Jennifer M. Dolan	Art Unit 2813	

**--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

THE REPLY FILED 15 May 2006 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☐ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a) ☐ The period for reply expires \_\_\_\_\_ months from the mailing date of the final rejection.  
b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on \_\_\_\_\_. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

#### AMENDMENTS

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because  
(a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);  
(b) ☐ They raise the issue of new matter (see NOTE below);  
(c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or  
(d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: \_\_\_\_\_. (See 37 CFR 1.116 and 41.33(a)).


4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).  
5. ☐ Applicant's reply has overcome the following rejection(s): \_\_\_\_\_.  
6. ☐ Newly proposed or amended claim(s) \_\_\_\_\_ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).  
7. ☒ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☒ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.  
The status of the claim(s) is (or will be) as follows:  
Claim(s) allowed: none.  
Claim(s) objected to: none.  
Claim(s) rejected: 1-20.  
Claim(s) withdrawn from consideration: none.

#### AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).  
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).  
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

#### REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because:  
See Continuation Sheet.  
12. ☐ Note the attached Information Disclosure Statement(s). (PTO/SB/08 or PTO-1449) Paper No(s). \_\_\_\_\_  
13. ☐ Other: \_\_\_\_\_

  
**CARL WHITEHEAD, JR.**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**

Continuation of 11. does NOT place the application in condition for allowance because: The Applicant's arguments are addressed as follows:

The 35 U.S.C. 112 first paragraph rejection has been withdrawn based on the amendment to the claims.

The rejection of claims 1-20 based on Lee in view of Akram has been withdrawn based on the Applicant's arguments.

Regarding the rejection of claims 1-20 using Kirloskar: The Applicant argues that "all of the volume immediately surrounding the semiconductor devices" is not filled with encapsulant, since the collapsible spacers occupy a substantial portion of that volume. The Applicant further argues that it would not be reasonable to consider the spacers part of the heat spreader, since Kirloskar specifically discloses attaching the collapsible spacers to the heat spreader panel

These arguments are not persuasive, because the Applicant has not specifically set forth the extent of volume that is to be considered "the volume immediately surrounding the semiconductor devices." Hence, the Examiner maintains that it is reasonable to interpret the volume immediately enclosing the semiconductor device and interior to the collapsible spacers as the claimed volume. It is apparent based on the Applicant's arguments that the intended volume is the entire volume interposed between the flat panel heat spreader and the substrate, except that filled by the other claimed components. The Examiner recommends adding such a limitation to the claims.

Even if the claims are amended in the manner supra, the Examiner further maintains that it is reasonable to consider the collapsible spacers to be part of the heat spreader. The Examiner notes that the claims do not require that the heat spreader be a single or unitary body; hence, it is not particularly relevant whether Kirloskar teaches attaching the spacer elements. Since Figure 5F clearly shows the metal panel integrated in a single assembly with the collapsible spacers, where the spacers are formed of a heat conductive material (solder), and hence can function to spread heat between the metal panel and the substrate, and where the entire assembly is attached to the semiconductor device to act as a heat spreader (figure 5G), it is reasonable to consider the spacers to be part of the heat spreader assembly.

Regarding the rejection of claims 1-4, 6-9, and 11-20 based on Combs in view of Lin, the Applicant essentially argues that since Combs is drawn to stress management of the region above the die, and since Combs is silent as to stress management below the die, then Combs teaches away from using known stress management methods, such as those in Lee, in the region below the die. The Applicant further suggests that a combination of Combs and Lin is based only on hindsight reasoning.

This argument is not persuasive, because the mere absence of a teaching in a reference does not constitute "teaching away" from inclusion of that element. Since Lin clearly shows that it is well-known and notoriously old in the art to apply an underfill material beneath a flip chip in order to manage thermal stresses under the chip (i.e., between the chip and the underlying circuit board substrate), it is both reasonable and prima facie obvious to apply an underfill material beneath any prior art flip chips. The fact that Combs omits any mention of an underfill does not in any way suggest undesirability of an underfill or preclude inclusion of an underfill based on the well-known benefits taught in Lin. The Examiner maintains that a person skilled in the art would expect that a combination of Combs and Lin would cause thermal stress alleviation above the chip (i.e. between the chip and heat spreader) and thermal stress alleviation as well as solder joint protection below the chip (i.e., between the chip and the wiring board), based on the respective teachings of Combs and Lin.